

## MOLEHOLE EMBEDDED 3-D CROSSBAR ARCHITECTURE USED IN ELECTROCHEMICAL MOLECULAR MEMORY DEVICE

### ABSTRACT OF THE DISCLOSURE

[0172] This invention provides a new design and fabrication for a three-dimensional  
5 crossbar architecture embedding a sub-micron or nanometer sized hole (called a molehole)  
in each cross-region. Each molehole is an electrochemical cell consisting of two or more  
sectional surfaces separated by a non-conductor (*e.g.* a dielectric layer and solid electrolyte).  
When used in electrochemical molecular memory device (EMMD), the architecture  
provides unique features such as a nano-scale electroactive surface, no interaction between  
10 memory elements, and easier miniaturization and integration.

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